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NOTES ON GEOGRAPHIC DISTRIBUTION

First record of *Aetomylaeus asperrimus* Gilbert, 1898, Roughskin Eagle Ray (Myliobatiformes, Myliobatidae), from El Salvador: additional data from the Eastern Tropical Pacific

Jazminne S. Paiz[1,2], Diego Fallas-Madrigal[2,3], Andrea Parada-Hércules[1,2]

1 *Escuela de Biología, Facultad de Ciencias Naturales y Matemática, Universidad de El Salvador, San Salvador, El Salvador*
2 *Oceanic Alliance, Aserrí, San José, Costa Rica*
3 *Museo de Zoología/Centro de Investigación en Biodiversidad y Ecología Tropical, and Posgrado en Biología, Universidad de Costa Rica, San José, Costa Rica*

Corresponding author: *Jazminne S. Paiz (spaiz4271@gmail.com)*

Abstract. In 2024, two females of *Aetomylaeus asperrimus* Gilbert, 1989 (Myliobatiformes, Myliobatidae) were caught while fishing using an artisanal longline in El Salvador. The rays were identified by their rhomboid disc and unique dorsal pattern. An analysis of stomach contents showed a diet mainly composed of crustaceans and gastropods. In Central America, this species has only been reported from Panama and Costa Rica. The new data highlights the need for further study of this species with the collaboration of local communities.

Keywords. Batoid, Central America, Data Deficient, fishermen, occurrence

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INTRODUCTION

Great data deficiency persists in rays, with critical gaps in our knowledge of the taxonomy, life history, molecular genetics, and abundance and distribution of these fish (Naylor et al. 2012; Bräutigam et al. 2015; Dulvy et al. 2021; Hirschfeld et al. 2021; Shiffman et al. 2022). Rays play an important role in maintaining the health and balance of marine ecosystems, yet both commercially important and non-commercial species are commonly caught as bycatch, particularly by trawlers (Blaber et al. 2009; Last et al. 2016; Dulvy et al. 2021). In El Salvador, an average of 412 marine species have been recorded as bycatch in artisanal and industrial shrimp fisheries, including four species from the family Myliobatidae (Fuentes et al. 2014). Despite increased scientific attention to elasmobranchs, recent investigations in underexplored regions continue to reveal new elasmobranch species, extend geographic distribution, and rediscover species (White 2014; Fahmi and White 2015).

Aetomylaeus asperrimus (Gilbert 1898), Roughskin Eagle Ray, is one of the six broadly distributed eagle rays in the genus *Aetomylaeus* Garman 1908. It has been assessed as Data Deficient by the International Union for Conservation of Nature (IUCN) due to insufficient information, which includes a lack of occurrence records (Last et al. 2016; Kyne et al. 2020). This species is expected to occur from Mexican waters to northern Peru, including the Galapagos Islands (Castro-Aguirre and Espinosa-Pérez 1996; Bussing and López 2009; Robertson and Allen 2015; Weigmann 2016; Ehemann et al. 2018; Espinoza et al. 2018), yet its known geographic distribution shows information gaps in the Eastern Tropical Pacific, as the available information is based solely on broad taxonomic checklists and identification guides (Last et al. 2016; Chávez et al. 2022). Until the recent reports of *A. asperrimus* from Costa Rica by Chávez et al. (2022), Panama was the only country in Central America with verified records. Here, we provide the first occurrence records of *A. asperrimus* in El Salvador, which will help contribute to a better understanding of this species distribution in the Eastern Tropical Pacific.

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METHODS

The specimens were fished by artisanal fishermen in 2024 using a pelagic longline. The fish were captured at a depth of 7–10 m, approximately 1 km southeast of Puerto de la Libertad, El Salvador (13.4867°N, 089.3188°W). The size of the hook used was a number 7 (6.5 cm). These details were provided by Mr. Elmer Antonio Flores, a fisherman from Puerto de la Libertad. Specimens were photographed dorsally and ventrally immediately after capture, sexed, and disc width and length measured. The stomach and tissue samples from the pelvic fins were donated by the fishermen. Tissue samples were preserved in ethanol 95% and deposited in the Laboratorio de Biología Celular y Molecular from Escuela de Biología, Universidad de El Salvador, under the collection number Aa-002, and the Icthyology collection of the Museo de Historia Natural de El Salvador (MUHNES), under the registration number 41-0001 for future genetic studies. Specimens identification followed Fischer et al. (1995), Last et al. (2016), Chávez et al. (2022), and FishBase (Froese and Pauly 2024). Information of occurrence records was extracted from the scientific literature (Chávez et al. 2022), Fishnet 2 (Fishnet 2 2017), and the Global Biodiversity Information Facility (GBIF) databases (GBIF 2023). The geographic distribution was derived from Kyne et al. (2020) and Robertson and Allen (2015). To verify the accuracy of the information in GBIF, we used the criterion of geographical coherence, assessing whether the reported locations for the species align with its known distribution. As part of this study, an analysis of the stomach contents was conducted, for which the digestive system was extracted. Once extracted, the ends of the esophagus and cloaca were tied with nylon thread to prevent the loss of stomach content during handling. The content was then stored in a Ziploc bag and transported to the laboratory. The samples were analyzed using a stereoscope, following the methodology described by Fischer et al. (1995).

RESULTS

***Aetomylaeus asperrimus* Gilbert, 1898**
Figures 1, 2

New record. EL SALVADOR – La Libertad • ca. 1 km SE of Puerto Malecon; 13.4867°N, 089.3188°W; 28.XI.2023; J.S. Paiz obs.; 1 ♀, disc width 88.5 cm • same locality; 18.XIII.2023; A. Parada obs.; 1 ♀, disc width 113 cm.

Identification. The dorsal coloration and shape of the examined specimens are congruent with the descriptions by Last et al. (2016) and Chávez et al. (2022) (Figure 1A, B). The numerous whitish bands and spots, brownish dorsal coloration, and a rhomboidal disc approximately twice as wide as it is long unequivocally confirm the specimens as *A. asperrimus*. Both specimens had their tails damaged or removed during handling.

Stomach content analysis. The stomach content of one of our specimens (Figure 1B) revealed a diet of mainly crustaceans (Figure 3C), as characterized by the presence of exoskeleton fragments, spines, and some well-preserved shrimp chelae (Figure 3C). Additionally, fragments of gastropod shells (Figure 3B) were found. However, the precise taxonomic identification of these prey items was hindered by their advanced state of digestion.

DISCUSSION

Aetomylaeus asperrimus is a relatively rare species from the Eastern Tropical Pacific, listed as Data Deficient due to the critical gaps in our understanding of the species biology, distribution, and ecology (Last et al. 2016; Kyne et al. 2020; Chávez et al. 2022). Reports of *A. asperrimus* suggest that the species occurs in a long stretch of coast in the Eastern Tropical Pacific (Castro-Aguirre and Espinosa-Pérez 1996; Bussing and López

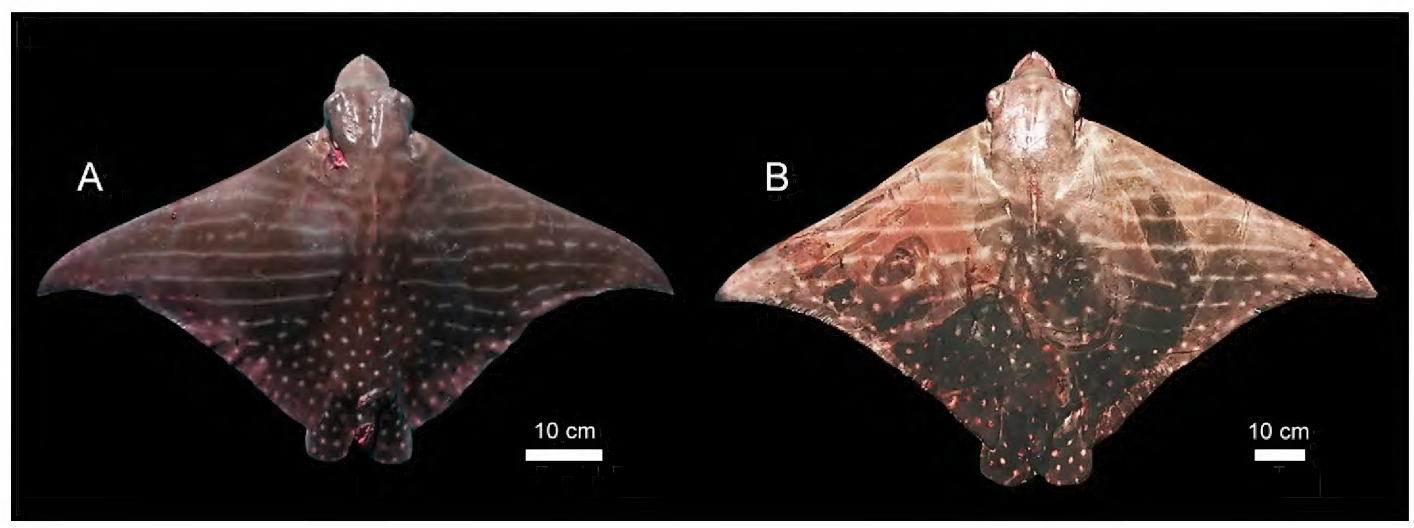

Figure 1. Two female specimens of *Aetomylaeus asperrimus* (Gilbert 1898). **A.** Disc width 83.5 cm, disc length 47.8 cm. **B**. Disc width 113 cm, disc length 62 cm.

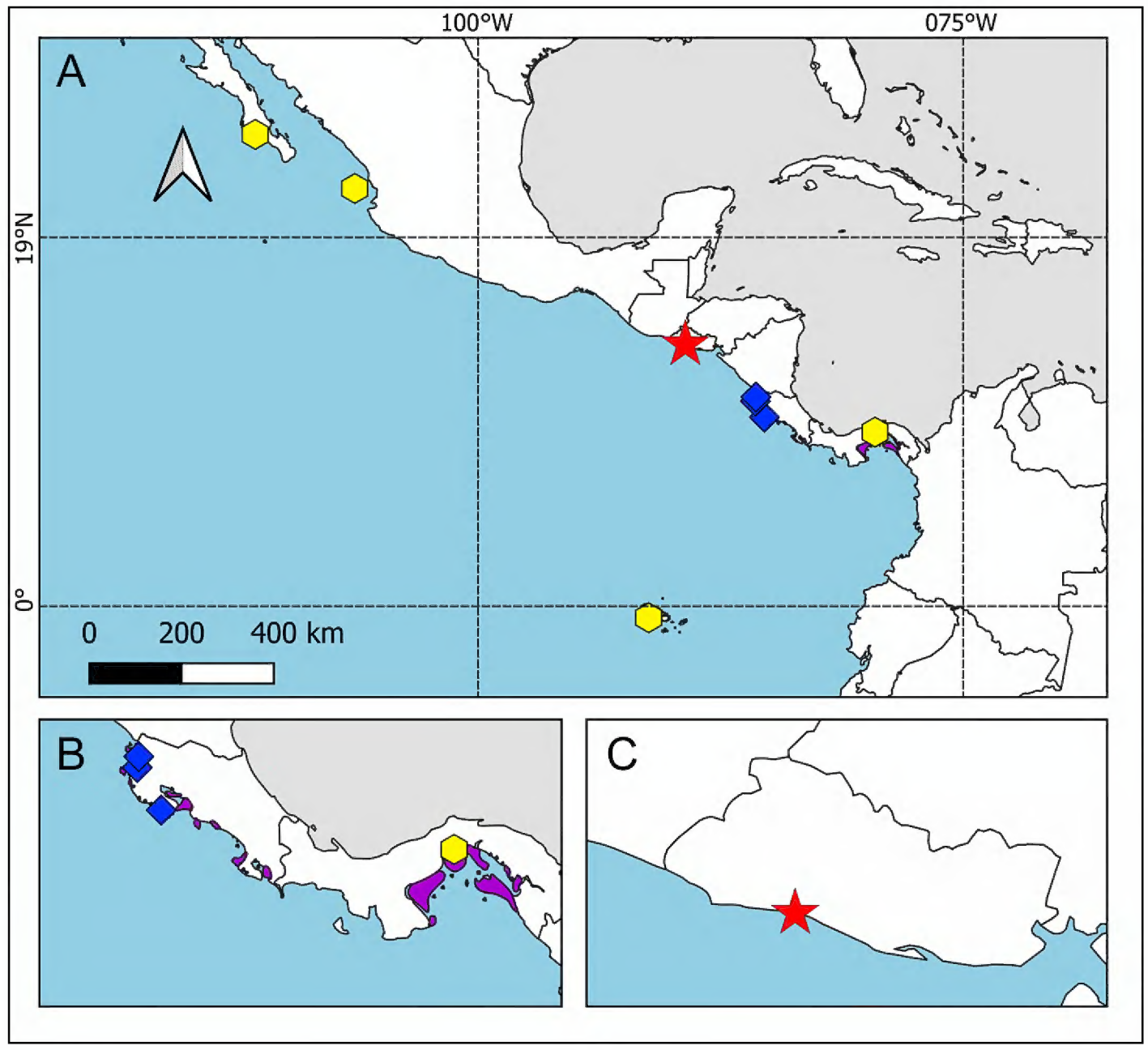

Figure 2. Distribution of *Aetomylaeus asperrimus* with purple polygons retrieved from the IUCN Red List, yellow hexagons for museum records from Fishnet2 and GBIF records, blue diamonds for reports from Costa Rica, and a red star for the new reports from El Salvador.

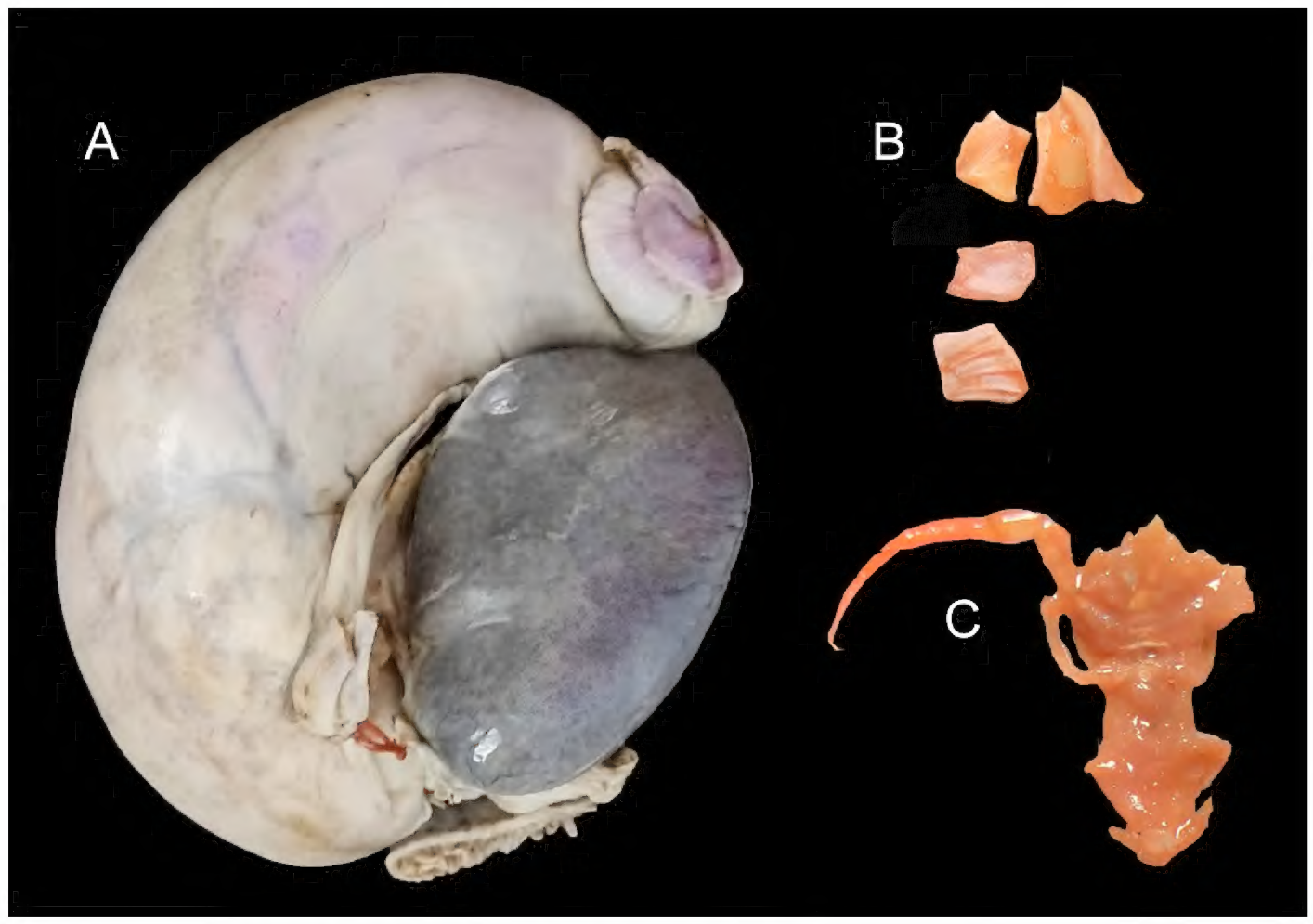

Figure 3. Stomach content analysis of *Aetomylaeus asperrimus*. **A**. Dissection of the stomach to analyze its contents. **B, C.** Some stomach contents including gastropod shells and crustaceans, respectively.

2009; Robertson and Allen 2015; Weigmann 2016; Ehemann et al. 2018; Espinoza et al. 2018), and with these first records in El Salvador, we increase this species geographic range by about 470 km to the northwest of its closest previously known occurrence in Costa Rica (Chávez et al. 2022). There is a 2,700 km gap to closest report in the north in Baja California (Chávez et al. 2022).

Costa Rica is the only country with recent occurrences of *A. asperrimus*, but the species is believed to be rare in that country and occurrences here are thought to have been driven by the El Niño-Southern Oscillation (Chávez et al. 2022). Since the reports by Chávez et al. (2022), and through citizen science programs,

in Costa Rica, only two new occurrences of the species have been documented (D. Fallas-Madrigal personal communication), whereas in El Salvador fishermen report that two or three of these specimens can be captured per year from along the coast of Puerto de La Libertad. Thus, the reports from these fishermen suggest that this species may be more common in the area than previously thought and also highlights an important disconnection between the scientific community and local fishermen. For instance, this showcases the importance of a better traceability of the rays that are been fished in El Salvador, since the consumption of ray meat is relatively common; rays are often sold in restaurants in the central region or used as a natural remedy for certain illnesses (J.S. Paíz and A. Parada personal observation).

While these reports support the understanding of the occurrence of the species, the results of the stomach content analysis also provide important insight into the species diet, which is primarily composed of crustaceans. A primarily crustacean-based diet is consistent with prior reports of benthic-feeding behavior among rays in the Eastern Pacific (Last et al. 2016). The presence of exoskeleton fragments, shrimp chelae, and mollusk shells provides preliminary insights into the trophic ecology of *A. asperrimus*, but much remains unknown. The assessment of this species as Data Deficient by the IUCN is the result of having very limited information (Kyne et al. 2020). Thus, to properly assess this species, more data are essential, including information on its feeding habits, population dynamics, and vulnerability to fishing pressures.

This report significantly contributes to the understanding of elasmobranch biodiversity in El Salvador and highlights the importance of gaining a better understanding of the marine species present in the country. As González et al. (2019) stated, it is crucial to deepen the study of these species in order to implement effective conservation strategies.

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: PJS, PA. Data curation: PJS, FMD, PA. Formal analysis: PJS, FMD, PA. Funding acquisition: PJS, FMD, PA. Investigation: PJS, FMD, PA. Methodology: PJS, PA. Resources: PJS, PA. Supervision: PJS, FMD. Visualization: PJS, FMD. Project administration: PJS, PA. Validation: PJS, FMD; PA. Writing – original draft: PJS, FMD, PA. Writing – review and editing: PJS, FMD, PA.

Author ORCID iDs

JS Paiz https://orcid.org/0009-0003-1246-8436
D Fallas-Madrigal https://orcid.org/0000-0001-9327-0752
A Parada-Hércules https://orcid.org/0009-0004-0052-7141

Data availability

All data that support the findings of this study are available in the main text.

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